

# UNISTACK CONTAINER WITH CORNER STACKING TABS

## RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Application No. 10/351,108  
5 which claims priority to U.S. Provisional Application No. 60/352,069 filed January 24,  
2002, the benefit of which is hereby claimed under 35 U.S.C. § 119(e).

## FIELD OF THE INVENTION

The present invention relates to corrugated paperboard containers, and more  
particularly, to single-piece container blanks capable of forming interlocking stacked  
10 containers with cutouts for the display of product.

## BACKGROUND OF THE INVENTION

Containers used to package products for display, especially perishable items such  
as fruit and vegetables, must meet a variety of requirements. One important requirement  
is that the container be strong enough to contain the product from the time it is packed  
15 until the time it is unpacked. It is also important that the container have sufficient  
stacking strength so that several containers may be stacked vertically during shipment.  
Another desirable feature for efficient transportation is to have stacking tabs protruding  
from one container and insertable into an opening of an adjacent container to prevent  
shifting and possible destacking. See for example U.S. Pat. No. 6,296,178 B1.  
20 Furthermore, for some products it is desirable that the container includes openings in the  
sides and ends so that they may also serve as a display for the product within when it  
reaches the point of sale, even when the containers are stacked.

One known method of providing stacking tabs and openings is to provide tabs  
along one or more tops of the sides of the container, with corresponding apertures in the  
25 bottom within which the tabs may be inserted. See for example U.S. Patent No.  
6,296,178 B1. Typically, such arrangements preclude the use of openings in the sides  
and ends of the containers because of the locations of the tabs. Furthermore, unless the

tabs are placed on all four sides of the container, they only provide optimum resistance to movement in the direction parallel to the face of the tabs, and are more prone to failure (bending) in the direction perpendicular to the tabs.

Another known method of providing stacking tabs is to provide tabs along the outside edge of the corners, with corresponding notches in the outside bottom of the corner. Such tabs prevent the upper container from shifting outwardly off the lower container, but do not resist the corner of the upper container from falling into the lower container. The tabs also do not result in optimum column alignment, reducing the columnar strength of the container. An 1/8" error in alignment can result in a 40% reduction in strength. Furthermore, the notches in the outside bottom of the container also substantially reduce the stacking strength of the corrugated material.

#### SUMMARY OF THE INVENTION

The present invention is directed to providing a single-piece containerboard blank from which a container is easily formed and maintained. The present invention includes cutouts in the sides and ends to optimize the display of product within the container and trapped corner stacking tabs to improve its stack-ability and resistance to destacking.

In accordance with aspects of the present invention, a single-piece containerboard blank is provided having a bottom panel with a side edge, an end edge and a truncated corner edge extending between the side edge and the corner edge. A side panel is hingedly attached to the bottom panel along the side edge. An end panel is hingedly attached to the bottom panel along the end edge. An adjacent edge of the end panel is an end panel end edge. An internal corner stacking tab assembly is hingedly attached to the end panel at the end panel end edge along a first fold line. The internal corner stacking tab assembly includes a plurality of segments hingedly connected at a second fold line and a third fold line. A tab extends from an edge of the internal corner stacking tab assembly. The tab is positioned substantially transverse of the third fold line.

## BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying  
5 drawings, wherein:

FIGURE 1 is a plan view of one embodiment of a container blank formed in accordance with the present invention;

FIGURE 2 is a perspective view of a partially assembled container according to the present invention;

10 FIGURE 3 is a perspective view of a more fully assembled container according to the present invention;

FIGURE 4 is a perspective view of a still more fully assembled container according to the present invention;

15 FIGURE 5 is another perspective view of a partially assembled container according to the present invention;

FIGURE 6 is a perspective view of a substantially assembled container according to the present invention;

FIGURE 7 is a perspective view of an assembled container according to the present invention

20 FIGURE 8 is a plan view of one embodiment of a container blank formed in accordance with the present invention;

FIGURE 9 is a perspective view of a partially assembled container according to the present invention;

25 FIGURE 10 is a perspective view of a more fully assembled container according to the present invention;

FIGURE 11 is a perspective view of a still more fully assembled container according to the present invention;

FIGURE 12 is another perspective view of a partially assembled container according to the present invention;

FIGURE 13 is a perspective view of a substantially assembled container according to the present invention;

5       FIGURE 14 is a perspective view of an assembled container according to the present invention

FIGURE 15 is a plan view of one embodiment of a container blank formed in accordance with the present invention.

#### 10           DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is a single sheet of foldable material cut and scored to form a blank formable into a container. By way of overview and with reference to FIGURES 1- 7, one presently preferred embodiment of the present invention includes a single piece blank 10 arranged to form a stackable tray type container 90.

15       FIGURE 1 depicts a presently preferred embodiment of the blank 10. Blank 10 has a bottom panel 12 bounded by side edges indicated as fold lines 22, 24, end edges indicated by fold lines 26, 28 and truncated corner edges 39a, b, c and d. Hingedly attached to the bottom panel 12 at the fold lines 22, 24 are longitudinal side panels 14 and 16. Also, hingedly attached to the bottom panel 12 at fold lines 26 and 28 are end  
20   panels 18 and 20.

The central outer portions of each of the side panels 14 and 16 have inwardly extending side panel cutouts 30 and 32. The depth of the side panel cutouts 30 and 32 is preferably less than about one half of the width of the side panels 14 and 16 respectively. Similarly, the outer portions of end panels 18 and 20 have end panel cutouts 34 and 36  
25   that extend from the outer edge of the end panels 18 and 20 in a location near the center of the end panels 18 and 20. Like the side panel cutouts 30, 32, the depth of the end panel cutouts 34, 36 are preferably less than about one half of the width of the end panels

18 and 20, respectively. However, those in the art will appreciate the depth of both the side panel cutouts 30, 32 and end panel cutouts 34, 36 may be deeper or shallower.

The corners of the bottom panel 12 are cut away at truncated corner edges 39a, b, c and d to form bottom panel cutouts 38a, b, c and d. Each bottom panel cutout 38a, b, c and d is configured to receive a tab 86, discussed in more detail below, when a plurality of container 90 are vertically stacked (not shown). In a presently preferred embodiment, the bottom panel cutouts 38a, b, c and d are substantially triangularly shaped. However, other bottom panel cutout 38a, b, c and d geometry's are considered within the scope of this invention, such as, without limitation, conical.

Side panel 14 has an internal corner stacking tab assemblies 50 and 52 extending in a longitudinal direction from opposite ends of the side panel 14. Side panel 16 carries similar internal corner stacking tab assemblies 54 and 56 extending longitudinally from opposite ends thereof. Internal corner stacking tab assemblies 50 and 52 are mirror images of each other. Similarly, internal corner stacking tab assemblies 54 and 56 are mirror images of internal corner stacking tab assemblies 50 and 52, respectively. Accordingly, any discussion related on one of the internal corner stacking tab assemblies 50, 52, 54, 56, applies equally to all others. For simplicity, the internal corner stacking tab assemblies 50, 52, 54, 56 are described in conjunction with internal corner stacking tab assembly 50.

Internal corner stacking tab assembly 50 is preferably composed of three segments: an inner segment 60, a middle segment 62 and an outer segment 64. Inner segment 60 is separated by first fold line 66 from the side panel 14, middle segment 62 is separated by a second fold line 68 from inner segment 66 and outer segment 64 is separated by a third fold line 70 from middle segment 62. Each of the first, second and third fold lines are parallel to each other and perpendicular to fold line 22 between side panel 14 and bottom panel 12. The inner edge 72 of internal corner stacking tab assembly 50 is offset slightly outwardly from the fold line 22 between side panel 14 and

bottom panel 12. A diagonal cutout 74 extends from the outer edge 78 of the outer segment 64 to a location near the outer longitudinal edge 80 of the outer segment 64.

The transition portions of middle segment 62 and outer segment 64 adjoining the third fold line 70 carry a notch 82 that extends a small distance inwardly from inner edge 72 and longitudinally in both directions from third fold line 70. The notch 82 lies substantially transverse of the third fold line 70. Similarly, the outer transition portions of the middle segment 62 and outer segment 64 adjoining the third fold line 70 extend outwardly and longitudinally from the outer edge 78 of the internal corner stacking tab assembly 50 at the third fold line 70 to form an outwardly extending tab 86. Like the notch 70, the tab 86 is substantially transverse of the third fold line 70 and is generally positioned opposite the notch 82.

Those skilled in the art will appreciate that the present blank 10 can be erected on suitable automatic machinery such as a modified tray former. Likewise, the blank 10 can be erected manually through appropriate folding. Prior to folding, an adhesive is applied to the container blank 10, as appropriate. See FIG. 1 for one embodiment of adhesive lines that may be used in the present invention. Adhesive lines are designated collectively as elements 100 in FIG. 1. The adhesive lines are placed on each of the internal corner stacking tab assemblies 50, 52, 54 and 56, and are described in conjunction with the internal corner stacking tab assembly 50. One or more adhesive lines 100 are placed on the inner surface of each of middle segment 62 and outer segment 64. Adhesive lines 100 are also placed on end panels 18 and 20 perpendicular to fold lines 26 and 28 in a location near the internal corner stacking tab assemblies 50, 52, 54 and 56. It should be understood that FIG. 1 is illustrative and not limiting to the present invention. Other configurations of adhesive sizes, shapes, numbers of applications, or placements may be used as would be understood by one of ordinary skill in the art. An example adhesive may be a suitable hot melt which could be applied through automatic applying means known to those skilled in the art, or other known

adhesives. Likewise, mechanical couplers such as staples, used alone or in conjunction with an adhesive is also considered within the scope of this invention.

FIGURES 2-7 illustrate an embodiment of the container 90 forming process. For the purpose of further description herein, the downward direction is defined as the direction perpendicular to bottom panel 12 that corresponds to the outer surface of the bottom panel 12 when the container 90 has been erected. The upward direction is defined as the direction perpendicular to the bottom panel that corresponds to the inner surface of the bottom panel when the container 90 has been erected. The formation of the internal corner stacking tab assemblies 50, 52, 54 and 56 are described in conjunction with the internal corner stacking tab assembly 50.

As shown in FIGURE 2, the first step in forming the container 90 is to fold the outer segment 64 downward at 90° along the third fold line 70. This also folds the outermost portion of tab 86 and the outermost portion of cutout 82 downward at 90° along the third fold line 70. Continuing construction in FIGURE 3, the combined middle segment 62, outer segment 64, notch 82 and tab 86 are then folded upward 180° along the second fold line 68 over onto inner segment 60. As shown in FIGURE 4, side panel extension 50 (comprising the inner segment 60, middle segment 62, outer segment 64, notch 82 and tab 86) is then folded 90° along the first fold line 66 over onto side panel 14. As shown in FIGURES 5 - 7, the side wall panels 14 and 16 are folded upwardly 90° and the end wall panels 18 and 20 are then folded upwardly 90°. The end wall panels 18 and 20 are then joined with internal corner stacking tab assemblies 50, 52, 54 and 56.

Variations in formation may be made. For example, outer segment 64 and middle segment 62 may be folded along the second fold line 68 before outer segment 64 is folded along third fold line 70.

FIGURES 8-15 depict another aspect of the present invention. Specifically, the corner stacking tab assemblies 50, 52, 54, and 56 are attached to the end panels 18 and 20. Substantially all other aspects are the same as disclosed above. Additionally,

FIGURE 15 depicts a blank 10 wherein the side panels 14, 16 do not include end cutouts 34, 36. It will be appreciated, that blank 10 and container 90 may include both end panel cutouts 34, 36 and side panel cutouts 20, 32, (FIGURES 1-7) either end panel cutouts 34, 36 or side panel cutouts 20, 32, (FIGURES 8-15) or may not include any cutouts at all (not shown).

FIGURES 9-14 illustrate one method of forming the container 90 of the present invention. As shown by way on nonlimiting example, the inner segment 60, middle segment 62, and outer segment 64 are folded about first fold line 66. Outer segment 64 may then be folded outward about the third fold line 70. Subsequently, both the outer segment 64 and the middle segment 62 may be folded inwardly about the second fold line 68. At this point, the outer segment 64 is adjacent the end panel 20 and middle segment 62 is adjacent the inner segment 60. The end panels 18, 20 may then be folded upwardly such that end panels 18, 20 are substantially perpendicular to the bottom panel 12. Then side panels 14, 16 may then be folded upwardly to bring the side panels 14, 16 adjacent the inner segment 60. Those skilled in the art will appreciate that other folding patterns and procedures may be used to accomplish the final container 90 illustrated in FIGURE 14.

Once the container 90 has been erected, tab 86 forms a generally right-angled shape. As discussed above, bottom panel cutouts 38a, b, c and d are sized to accommodate the protruding tabs 86 from a container 90 directly beneath bottom panel 12. In addition, notch 82 is sized to accommodate a protruding tab 86 from a container directly beneath bottom panel 12. When multiple containers 90 have been stacked, side panels cutouts 30 and 32 and end panel cutouts 18 and 20 form display windows revealing any product within the containers.

It will be appreciated by those skilled in the container art that the present invention provides an easily formed and easily assembled product container from a single-piece containerboard material. The assembled container includes multi-ply corner



reinforcements that provide enhanced strength and stacking capability. The containers further include tabs and corresponding mating openings to help stabilize multiple containers 90 when stacked. The side and end wall cutouts permit the display of any product contained within stacked containers.

5           It will be also be appreciated by those skilled in the art that blank 10 and subsequent container may be constructed from a wide variety of materials. In a presently preferred embodiment, the material is a containerboard material. However other material, such as, without limitation, paperboard is considered within the scope of this invention.

10           While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.